# Implementing a National Management Plan for the Genus *Eriocheir* (Mitten Crabs)

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Chinese mitten crab: photo by Lee Mecum, CDFG.

In the short time since its introduction into the San Francisco Bay - Sacramento and San Joaquin Delta system (Bay-Delta) the late 1980s or early 1990s, the catadromous mitten crab (Genus *Eriocheir*) has become abundant and widely distributed throughout the Bay-Delta.

The mitten crab has the potential to inflict significant damage on the Bay-Delta ecosystem and the regional economy. The introduction of Chinese mitten crabs to the Bay-Delta, and other diverse regions of the world, indicates that *Eriocheir* are capable of establishing additional populations in habitable U.S. waters. Mitten crabs may be introduced through illegal importation and unintentional release or intentional release to establish a commercial fishery.

The Aquatic Nuisance Species Task Force (ANSTF) is an intergovernmental body established by the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990. The ANSTF has followed the mitten crab introduction to California since early 1998 and determined that, under the authority of NANPCA, the development of a comprehensive management plan for the genus *Eriocheir* was appropriate and necessary. In 2001 the ANSTF developed a Mitten Crab Control Committee charged with the task of reviewing and editing that draft plan. The broad and representative membership of the committee has worked cooperatively to complete a management plan that will best meet the needs of this evolving issue.

The final National Management Plan for the Genus Eriocheir (Mitten Crabs) (NMP) was approved by the ANSTF in November, 2003 and is available on the internet at: www.fws.gov/contaminants/OtherDocuments/MCMgmtPlan%20FINAL.pdf

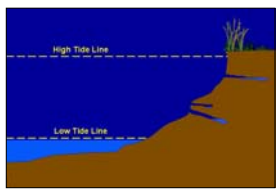

Customs agents seized these live mitten crabs, in carry –on luggage, at San Francisco International Airport. (Photo by Marc Gilkey, USDA.)

In November 2001 U.S. Fish and Wildlife Service agents seized 10 cartons at JFK International Airport containing more then 1,300 live mitten crabs, which is a violation of the Lacey Act.

## Why is the Mitten Crab a Problem?

- Mitten crabs are omnivorous throughout their lifecycle and can feed on and directly impact resident flora and fauna.
- Bait stealing by mitten crabs interferes with recreational fishing in the Bay-Delta.
- Fish salvage operations, designed to protect endangered species, have been severely impacted by the downstream migration of mitten crabs.
- Burrowing by mitten crabs may contribute to bank erosion, which can threaten California's water supply.
- Agricultural crops may be damaged directly by feeding or indirectly by hydrologic changes.
- Mitten crabs can serve as secondary hosts for the Asian lung fluke (*Paragonimus westermanii*), which can cause disease in humans or animals that become infected with this parasite.
- The mitten crab may also have the ability to colonize new areas within the U.S. with or without human assistance.

Burrowing by mitten crabs may contribute to bank sloughing and erosion which threatens levee stability. (Photo provided by T. Veldhuizen, D. Rudnick and C. Messer.)




Mitten crabs excavate burrows to retain water during tidal fluctuations, which may accelerate erosion of levees (Diagram by CDFG).

One of the action items for phase one of the National Management Plan for the genus *Eriocheir* (mitten crabs) calls for the development of a long-term monitoring and data collection program for age 0+ mitten crabs in the Sacramento-San Joaquin Rivers Delta.

Pilot studies of trapping methods, conducted by USFWS, California Department of Water Resources and other researchers, indicated that passive habitat traps are the most reliable method for observing and capturing age 0+ mitten crabs that are rearing in streams.

An equal number of passive habitat traps have been deployed in both the Sacramento River and the San Joaquin River systems annually since 2004 to monitor 0+ mitten crabs. During the period of April through October or each year, passive habitat traps are checked twice a month in random order by USFWS researchers.

A USFWS researcher deploys a passive habitat trap in support of age 0+ mitten crab monitoring.

A USFWS researcher measures stream environmental parameters to assess age 0+ mitten crab habitat preference.

## Implementation of NMP from 1999 through 2005

| Management Action | Funded by | Implemented by | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| Coordination of NMP implementation | FWS | FWS | | | | | | | X | X |
| Evaluate constituent based removal programs | FWS | CASG | | | | | | | | X |
| Megalopae monitoring, detection refinement | FWS | UCSB | | | | | | | X | |
| Larval recruitment assessment | FWS | PSU | | | | | | | X | |
| Literature search and report | FWS | FWS | | X | | | | | | |
| Workshop | FWS, UCD, WRP, SFEP | SFEP | | X | | | | | | |
| Monitoring programs; burrowing, life stages, annual distribution | IEP, CALFED, UCB | CDFG | X | X | X | X | X | | | |
| Detect upstream spread | FWS | FWS | | | | X | X | X | X | X |
| Detect upstream spread | CALFED | FWS | | | | | | | | X |
| Detect upstream spread | IEP | DWR | | | | X | | | | |
| Habitat use study | IEP | DWR | X | X | X | X | | | | |
| Interagency coordination | FWS | FWS | X | X | X | X | X | X | | |
| Lower Columbia detection and rapid response program | FWS, BPA, PSMFC | PSU | | | X | X | X | X | X | X |
| Identification materials | CDFG | CDFG | | | X | X | | | | |
| Prevention materials | OrSG | OrSG | | | X | | | | | |
| Prevention materials | FWS | FWS | | | | X | X | X | | |
| Prevention materials | BPA | PSMFC | | | | X | | | | |
| Megalopae settling study | FWS | UCSB | | | | X | | | | |
| Contaminant - mercury | FWS, USGS | USGS | | | X | X | X | X | | |
| Lung fluke | NSG, MSI | UCSB | | | X | X | | | | |
| Salvage facility R & D | USBR | USBR | | X | X | X | | | | |
| Salvage facility R & D | DWR | DWR | X | X | X | | | | | |
| USBR exclusion technology development | USBR | SFEI | X | | | | | | | |
| USBR monitoring | USBR | USBR | | X | | | | | | |
| USBR facility risk assessment | USBR | USBR | | X | | | | | | |
| Benthic impacts | CALFED | DWR | | | X | X | X | | | |
| Migratory cues | USBR | CDFG | | | X | | | | | |
| Law enforcement outreach and education | FWS | CDFG | | | | | X | | | |
| Evaluation workshop | FWS | FWS | | | | | X | | | |
| Salmonid egg predation | FWS | UCSB | | | | | | X | | |
| Environmental factors influencing abundance | FWS | FWS | | | | | | X | | |
| Breeding migration | SCVWD | UCSB | | | | X | | X | | |
| Lifecycle modeling | FWS | CSUF | | | | | | | | X |


The USFWS has collaborated with the CALFED Non-Native Invasive Species program to provide educational outreach about mitten crabs and other invasive species.

| Acronym | Organization | Type of Organization |
|---|---|---|
| BPA | Bonneville Power Administration | Corporate |
| CALFED | California Bay-Delta Authority | Inter-agency |
| CDFG | California Department of Fish and Game | CA State |
| DWR | Department of Water Resources | CA State |
| FWS | U.S. Fish and Wildlife Service | Federal |
| IEP | Interagency Ecological Program | Inter-agency |
| MSI | Marine Science Institute | Non-profit |
| NSG | National Sea Grant | Federal |
| OrSG | Oregon SeaGrant | Inter-agency |
| PSMFC | Pacific States Marine Fisheries Commission | Inter-state commission |
| SCVWD | Santa Clara Valley Water District | Special District |
| SFEP | San Francisco Estuary Project | Non-profit |
| UCB | University of California at Berkeley | CA State |
| UCD | University of California at Davis | CA State |
| UCSB | University of California at San Barbara | CA State |
| USBR | U.S. Bureau of Reclamation | Federal |
| USGS | U.S. Geological Survey | Federal |
| WRP | Western Regional Panel on Invasive Species | Inter-agency |

**Please report sightings of the mitten crab:**

**(888) 321-8913 (toll free)**
**www.delta.dfg.ca.gov/mittencrab**